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Divesting from Coal: Implications on Industry Structure and Borrowing Costs

Master Thesis in Business and Finance

Dominik Egloff

Full Text Version

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Divesting from Coal: Implications on Industry Structure and Borrowing Costs
Master Thesis in Banking and Finance

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Abstract

Financial companies are increasingly divesting from coal to reduce their environmental footprint. Debt divestment is real and significant: By 2020, 68 coal divestment plans were announced by banks managing loan books of nearly USD 20tn. Divestors reduce their exposure to the coal sector by 50% in the year of their divestment announcement, but the exposure increases again in subsequent years. Nevertheless, the social and governance scores of coal lenders increase by 5.4% between 2015 and 2019. Furthermore, the divestment movement has no significant impact on loan spreads. Therefore, the efficacy of debt divestment to curb coal production remains doubtful.

Executive Summary

The ongoing debate on climate change is affecting the financial sector considerably. Divesting from the fossil fuel industry in order to reduce a company's environmental footprint has become increasingly popular the 21st century (Ansar, Caldecott, and Tilbury, 2013). Coal is an effective divestment option because it is the most carbon intensive fossil fuel (IEA, 2019). As a result, over 100 major[1] banks and (re)insurers have restricted their exposure to coal-based business models since 2015 (IEEFA, 2020). BlackRock, the world's largest asset management corporation, also committed in 2020 to withdraw from active investments in thermal coal production within one year (BlackRock, 2020).

Recent research about divestment has mostly focused on divestment as a measure to avoid climate risks and to decarbonise the economy. Equity divestment is well documented (e.g. Ansar et al., 2013; Dordi and Weber, 2019) but little is known about debt divestment. This presents a research gap, as fossil fuel companies usually finance their operations through syndicated loans (Fickling, 2019). I complement the previous literature with an analysis of the debt divestment movement by the example of the coal sector.

This paper addresses the following hypotheses: First, do companies with divestment announcements reduce their debt exposure to the coal sector? Second, does a reduction in the supply of coal loans lead to higher loan rates for coal companies? Finally, do lenders which persistently invest in coal perform worse in sustainability scores than divesting companies?

To perform all analyses, I use syndicated loan transactions from Dealscan. Industry codes are available to identify borrowers in a specific industry sector. For the coal sector, industry codes are incomplete, as only coal mining companies can be identified. Other parts of the coal value chain cannot be identified by Dealscan. By manually collecting additional companies from the Global Coal Exit List (Urgewald e.V., 2019 and Urgewald e.V., 2020a), I create a data set with a broad definition of coal companies including transportation, logistics, coal power plant manufacturers and other services to the coal industry. All analyses are conducted for both definitions: The broad definition of *coal industry facilities* for the entire coal value chain including data from Dealscan and the Global Coal Exit List and the narrow definition of *coal mining facilities* provided by Dealscan.

[1] With assets under management or loans outstanding in excess of USD 10bn.

In addition, details about all divestment announcements are provided by the Institute for Energy Economics and Financial Analysis (Buckley, 2019 and IEEFA, 2020). Finally, I use the Thomson Reuters Eikon database to collect company-specific annual data, including sustainability scores.

The divestment movement started in 2015 (Buckley, 2019), when also the Paris Agreement was adopted. Therefore, I subsequently focus on the period between 2010 and 2019 to analyse similar pre-divestment and post-divestment periods.

First, I provide an overview of the recent divestment movement. Since 2015, 68 coal divestment plans have been announced by banks managing loan books of nearly USD 20tn. These banks cover a large portion of the total global debt financing. As the Institute of International Finance reports, the total global debt reached USD 258tn in the first quarter of 2020 (Tiftik, Mahmood, and Gibb, 2020). The share of these 68 divesting banks represents therefore about 7.8% of the global total debt. I further observe that the number of loans to coal companies declines after 2015, due in large part to lenders with coal divestment announcements. Divestors reduce their exposure to the coal sector on average by 50% in the year of the divestment announcement. However, in subsequent years, divestors' exposure to the coal sector increases again, partially offsetting the previous divestment effects.

I find no direct impact of the recent divestment movement on coal loan rates, as no significant effects can be observed for the post-2015 period. Between 2010 and 2014, banks with a future divestment announcement charge coal companies on average 5.2% higher loan spreads compared to non-divestors. Hence, divestors seem to be more aware of climate risks and, therefore, charge coal companies higher loan rates.

Moreover, I show that the social and governance scores of coal lenders increase on average by 5.4% between 2015 and 2019. Social and governance scores of divestors increase not only in the year of the respective divestment announcement but also in subsequent years. Although there is a correlation between being a divestor and obtaining a higher social and governance score, the causal implications remain unclear.

Given that the recent divestment movement only began in 2015 and is still ongoing, a longer period of analysis may allow for further conclusions to be drawn.

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Given that the recent divestment movement only began in 2015 and is still ongoing, a longer period of analysis may allow for further conclusions to be drawn.

The structure of this paper is as follows: Section 2 contextualises this paper with regards to previous research. Section 3 provides an overview of the main data set and describes the methods used to calculate the results presented in section 4. Section 5 draws conclusions from the findings of this paper and considers additional research possibilities for further studies.

2 Context and Previous Literature

Early publications on divestment movements have focused on social and financial incentives but not on environmental concerns. A well-researched example of the former is the divestment from companies that did business with South Africa's apartheid regime. The exact impact of the divestment movement on the fall of the apartheid regime remains unclear. However, Ansar et al. (2013) present a remarkable argument in favour of the positive effect of this divestment movement: South Africa was unable to find alternative lenders to compensate for the outflows of the divested creditors and suffered considerable losses. But this country-specific divestment campaign may not apply to the coal sector, as coal companies do not appear to suffer from similar lending constraints: While many Western lenders are announcing plans to divest from the coal sector, other lenders, particularly Chinese and Japanese, are entering the coal sector in search of additional yields at a time of low interest rates worldwide (Cadman, 2020).

In recent years, research on divestment movements has also focused on environmental concerns. These publications have mostly discussed divestment as a measure to avoid climate risks and to decarbonise the economy. Equity divestment is well documented, particularly for fossil fuel divestment campaigns (e.g. Ansar et al., 2013; Dordi and Weber, 2019). However, little is known about debt divestment. The focus on equity financing presents a research gap, as debt in particular is of great importance for the fossil fuel sector: carbon-intense sectors are largely debt financed (Delis, de Greiff, and Ongena, 2019). For the mining sector, including the coal industry, debt financing provided 5.7 times the value of equity financing between 2010 and 2018 (Gan, 2019). Fossil fuel companies usually rely on syndicated loans provided by a small number of institutions to finance their operations (Fickling, 2019). Therefore, the exit of only a few investors could have a larger impact on prices charged to coal companies. I complement these findings by analysing the debt divestment movement by the example of the coal sector, since coal is the most carbon intensive fossil fuel (IEA, 2019). In addition, my thesis is the first to present detailed research on the differences between divesting companies and persistently investing companies.

With regards to debt divestment, a recent paper by Delis et al. (2019) analyses the relationship between climate risk and the cost of debt for fossil fuel companies. The authors conclude that prior to the Paris Agreement in 2015, banks did not charge higher loan spreads for companies with a higher climate policy exposure. However, for the post-agreement period, they find evidence of a positive relationship between loan rates and fossil fuel companies with a higher exposure to climate policy risk. My study continues this line of research and examines the relationship between the divestment movement, sustainability scores and the cost of capital in the coal sector for the period before and after 2015.

3 Data and Methods

3.1 Main Data Set

The main analysis is based on data from Dealscan, the Global Coal Exit List (GCEL), the Institute for Energy Economics and Financial Analysis (IEEFA) and Thomson Reuters Eikon. Dealscan contains syndicated loan transactions with information on the lenders involved, the loan volume, the loan spread and borrowers' industry SIC codes. Other records are linked by the name of the lender. In total, Dealscan collects information on more than 160'000 loan facilities between 2010 and 2019. For a more detailed description of the Dealscan database, see Kellogg School of Management (2001).

Since the SIC code for the coal sector only identifies coal mining companies (first two digits of PrimarySICCode, SecondarySICCode or TertiarySICCode = 12), I manually collect additional coal companies from the GCEL (Urgewald e.V., 2019 and Urgewald e.V., 2020a). The GCEL is provided by the German NGO Urgewald and includes not only coal mining companies but companies from the entire coal value chain. 935 parent companies and over 1'800 subsidiaries and joint ventures are classified by Urgewald e.V. (2019) and Urgewald e.V. (2020a) as coal companies. The GCEL uses relative, absolute and exclusion criteria (Urgewald e.V., 2020b), similar to the thresholds chosen by divestors. The classification of the GCEL is therefore appropriate for analysing the impact of the coal divestment movement. All analyses are conducted for both coal definitions: The broader definition of *coal industry facilities* for the entire coal value chain and the more narrow definition of *coal mining facilities*. The number of companies in the entire coal value chain is substantially higher than only in the coal mining sector. An overview is provided in table 1.

Because only a small number of coal mining facilities can be observed from non-divestors, the results for the coal mining sector, included in Appendix B.1, may be inaccurate.

Divestment announcements are collected by the IEEFA. 68 large banks with assets under management or loans outstanding in excess of USD 10bn have announced plans to exit from the coal industry by December 2020 (IEEFA, 2020). Of those 68 banks with coal exit announcements, 52 banks participated in coal industry facilities observed by Dealscan between 2010 and 2019.

Table 1: **Overview: Number of Facilities and Lenders**

This table presents an overview of the number of facilities, including coal industry facilities and coal mining facilities from 2010 to 2019. Additionally, the number of lenders and divestors are included.

	All Facilities	Coal Industry Facilities	Coal Mining Facilities
Number of Facilities	160'576	2'667	605
Pre-2019 Divestor Facilities[1]	-	1'918	494
Divestor Facilities (starting from year of announcement)	-	724	174
Number of Lenders	8'200	1'112	422
Number of Divestors[2]	-	52	47
Source for Coal Company Identification	Dealscan	Dealscan[3] +GCEL	Dealscan[3]

1 Pre-2019 divestor facilities contain all facilities where at least one lender with a coal divestment announcement between 2015 and 2018 participated in the facility, including facilities prior to the announcement.

2 Source: IEEFA (2020)

3 First two digits of PrimarySICCode, SecondarySICCode or TertiarySICCode = 12

To collect information on sustainability scores and other company-specific annual indicators (total assets, total equity, total debt, return on equity), I use the Thomson Reuters Eikon database. These company-specific indicators are converted to USD, using exchange rates from the Wharton Research Data Services (2020) for the years 2010 to 2018. For 2019, as well as New Taiwan Dollars and Poland Zloty, I use exchanges from xe.com (2021) as these rates are not available in the Wharton Research Data Services. Since the data collection using Thomson Reuters Eikon is a manual process, I focus on the 68 divestor banks listed by the IEEFA (2020). In addition, I add other key banks, including the world's 20 largest commercial and investment banks by asset size in 2019. These banks are part of an analysis by the Rainforest Action Network (2020) calculating a banking coal policy score to analyse patterns in bank financing for the coal industry. I also use this banking coal policy score in my analysis.

3.2 Methods

3.2.1 Facility Analysis

The analysis of this paper is based on loan facilities reported by Dealscan. As usually more than one lender is involved in a syndicated loan facility, all lender-dependent variables[3] are weighted relatively to the lender's share of contribution to the loan. This bank allocation is reported by Dealscan for 29.5% of all facilities. Where the bank allocation is not reported, an equal allocation across all lenders is assumed. Appendix A.1 shows that the results are robust using different allocation methods.

Between 2010 and 2019, 168'775 loan facilities are observed in Dealscan. Facilities and lenders are matched using the FacilityID variable. After the facilities with incomplete lender information[4] are excluded, 160'576 loan facilities remain, of which 2'667 are coal industry facilities.

Dealscan reports the lender's name at a very specific regional branch or subsidiary level (e.g. Bank of America *Arizona*). In order to match lender-specific data from other sources than Dealscan, which is only available at the parent company level, about 3'000 names need to be manually rewritten. I also manually change the names of merged and acquired companies which occured before 2010 (e.g. Merrill Lynch renamed to Bank of America)[5], as some facilities after 2010 are reported with an outdated lender name.

3.2.2 Divestor Facility Analysis

To analyse the effects of divestment announcements, I assign a dummy variable to each facility that contains the divestment information. Coal divestment announcements are collected by the IEEFA (2020). This thesis uses two different definitions for divestor facilities: The first definition includes *Pre-2019 Divestors*, which includes all facilities where at least one lender with a coal divestment announcement before 2019 is involved in the

[3] SG score, banking coal policy score and company-specific annual indicators (total assets, total equity, total debt, return on equity)

[4] Due to incomplete data, the name of the lender is not always reported. Also, the total allocation does not always equal 100%. Therefore, I only analyse facilities with a total allocation of 90% to 110% and with a reported lender name.

[5] A list of mergers and acquisitions is provided by Schwert (2018).

facility[6], including facilities before the coal divestment announcement. The second definition includes *Divestors* and contains all facilities starting from the year of the respective coal divestment announcement.

3.2.3 Loan Spreads

To examine the effects of coal companies and the coal divestment movement on loan spreads, this paper follows the path of Delis et al. (2019) and uses the all-in-spread-drawn (AISD) as the main outcome variable, which equals the credit spread over LIBOR plus the facility fee. This variable is available for approximately half of all facilities between 2010 and 2019 (see table 2 for an overview). The all-in-spread-undrawn (AISU) variable, analysed by Delis et al. (2019) for robustness checks, is not appropriate for my data set, because the variable is only available for 11% of all facilities between 2010 and 2019.

The effect of coal companies and coal divestment announcements on the cost of credit is estimated using the following empirical model:

$$\begin{aligned} CL_{fclbt} = a + a_1 CoalCompany_b + a_2 Post2015_t + a_3 Post2015_t * CoalCompany_b \\ + a_4 Pre2019Divestor_l + a_5 Post2015_t * Pre2019Div_l + a_6 CoalComp_b * Pre2019Div_l \\ + a_7 CoalComp_b * Pre2019Div_l * Post2015_t \\ + a_8 F_{ft} + a_9 L_{lt} + u_{fclbt} \end{aligned} \tag{1}$$

In equation 1, CL is the cost of a facility *f*, measured as the AISD. The loan is syndicated in country *c* by a group of lenders *l* to borrower *b* in year *t*. *CoalCompany* is a dummy variable that has a value of 1 if the borrower is identified as a coal company and 0 otherwise. I conduct this analysis for both coal industry facilities and coal mining facilities. *Post2015* is a dummy variable that equals 0 before 2015 and has a value of 1 from 2015 onwards, to account for effects due to the start of the divestment movement and the Paris Agreement in 2015. *Pre2019Divestor* is a dummy variable that equals 1 if

[6] Approximately half of all divestment plans were announced between 2015 and 2018, see also figure 1 in section 4.1.

at least one lender with a divestment announcement before 2019 is involved in the loan, and has a value of 0 otherwise. Coal divestment announcements are collected by the IEEFA (2020). Furthermore, interaction terms between *Pre2019Divestor*, *CoalCompany* and *Post2015* are included. The alternative definition of divestors counting only facilities starting from the year of the respective coal divestment announcement is also used for robustness checks.

F are facility characteristics which could potentially correlate with the facility costs (loan volume, loan maturity and number of lenders in the syndicate). L are lender characteristics which could potentially correlate with the facility costs (asset size, leverage[7] and return on equity). As usually more than one lender is involved in a syndicated loan, lender characteristics are weighted relatively to the lender's share of contribution to the loan. Where no contribution is reported by Dealscan, an equal allocation across all lenders is assumed. See section 3.2.1 for more information. a is a vector of fixed effects (year, country of syndication and loan type) to control for unobserved characteristics and u is the error term.

[7] Leverage is defined as the ratio of total debt to total assets.

Table 2: **Overview: Data Availability**

This table presents an overview of the data availability for the loan spread (AISD) and the social and governance score (SG score). The years 2010 to 2019 are included. Coal mining facilities are defined by Dealscan. Coal industry facilities additionally include companies identified by the GCEL, see also section 3.1.

	All Facilities	Coal Industry Facilities	Coal Mining Facilities
Number of Facilities	160'576	2'667	605
- with AISD available	74'882 (47%)	1'187 (45%)	324 (54%)
- with SG score available	134'483 (84%)	2'253 (84%)	547 (90%)
Pre-2019 Divestor Facilities[1]	-	1'918	494
- with AISD available	-	1'049 (55%)	289 (59%)
- with SG score available	-	1'914 (99%)	491 (99%)
Divestor Facilities (starting from year of announcement)	-	724	174
- with AISD available	-	422 (58%)	111 (64%)
- with SG score available	-	724 (100%)	174 (100%)

1 Pre-2019 divestor facilities contain all facilities where at least one lender with a coal divestment announcement between 2015 and 2018 participated in the facility, including facilities prior to the announcement.

3.2.4 Sustainability Scores

To examine the effect of the coal divestment movement on sustainability scores, only coal industry facilities are analysed. I use two different sustainability scores: a modified version of the environmental, social and governance score (ESG score) and a time invariant banking coal policy score. Primarily, I use the social and governance score (SG score) based on ESG scores provided by the Thomson Reuters Eikon database. I do not use the environmental part of the ESG scores as this score could be correlated with being

a coal divestor[8]. Thomson Reuters Eikon calculates the social score in relation to peer companies in the same industry group[9]. The governance score is calculated by Thomson Reuters Eikon in relation to companies in the same country (Thomson Reuters Eikon, 2017).

The SG score of each lender is calculated as the average of the social score and governance score of each year. The SG score is available for over 80% of all facilities between 2010 and 2019 and for all banks with divestment announcements (see table 2 in section 3.2.3 for an overview). I calculate the SG score for each year and each lender separately.

The effects of coal divestment announcements on SG scores are estimated using the following empirical model:

$$SGScore_{fclt} = a + a_1 Pre2019Divestor_l + a_2 Post2015_t + a_3 Post2015_t * Pre2019Div_l + a_4 L_{lt} + u_{fclt} \quad (2)$$

In equation 2, the endogenous variable *SGScore* is the weighted[10] social and governance score of a coal facility *f*. The facility is syndicated in country *c* by a group of lenders *l* in year *t*. *Pre2019Divestor* is a dummy variable that has a value of 1 if at least one lender with a divestment announcement before 2019 is involved in the loan facility and 0 otherwise. Coal divestment announcements are collected by the IEEFA (2020). *Post2015* is a dummy variable that equals 0 before 2015 and has a value of 1 from 2015 onwards, to account for effects due to the start of the divestment movement and the Paris Agreement in 2015. I also include an interaction term between *Pre2019Divestor* and *Post2015*. I conduct this analysis for both coal industry facilities and coal mining facilities.

L are lender characteristics which could potentially correlate with the facility cost (asset size, leverage and return on equity). As usually more than one lender is involved in a syndicated loan, lender characteristics are weighted relatively to the lender's share of contribution to the loan. *a* is a vector of fixed effects for year and country of syndication

[8]Figure 10 in Appendix A.2 shows that the average ESG score and SG score follow a similar path for coal industry facilities between 2010 and 2019.

[9]For the lenders which I analyse, all lenders receive their social score in relation to the banking services industry.

[10]The SG score of the facility is the weighted average of all SG scores, relatively to the lender's contribution to the loan. See section 3.2.1 for more information.

to control for unobserved characteristics. The inclusion of fixed effects for the country of syndication is pivotal, as the governance score is calculated by Thomson Reuters Eikon in relation to companies in the same country (Thomson Reuters Eikon, 2017). u refers to the error term.

Equation 2 includes the exogenous variable *Pre2019Divestor* that has a value of 1 if at least one lender with a divestment announcement before 2019 is involved in the coal facility. The variable *Pre2019Divestor* is thus time invariant. When analysing all divestor facilities starting from the year of the coal divestment announcement, the exogenous variable *Divestor* becomes time variant. Therefore, the unbalanced sample structure needs to be addressed. As I cannot control for lender fixed effects when analysing the SG score on the aggregated facility level, the results could be inaccurate. Therefore, I analyse the difference in SG scores before and after divestment announcements on the company level, as written in equation 3. The SG scores is measured for a lender l in year t. No interaction term is included in equation 3 as no divestment announcements were made before 2015 and therefore only the period from 2015 to 2019 is analysed. a is a vector of fixed effects (year and lender) to control for unobserved characteristics and L are lender characteristics which could potentially correlate with the facility costs (asset size, leverage and return on equity). u refers to the error term.

$$SGScore_{lt} = a + a_1 Divestor_{lt} + a_2 L_{lt} + u_{lt} \tag{3}$$

For a more general analysis, I additionally use the banking coal policy score, which is calculated and used by the Rainforest Action Network (2020) to analyse patterns in bank financing to the fossil fuel industry. Since the banking coal policy score is conducted in absolute terms, I calculate score deciles. The banking coal policy score is derived in 2020 and is thus time invariant.

4 Results

4.1 Impact of Coal Divestment Announcements

This section examines coal divestment announcements and their impact on the coal sector. I find evidence that the number of syndicated coal loans decreases in the year of the respective coal divestment announcement. However, the exposure to the coal sector increases again in subsequent years.

The number of coal divestment announcements rises almost linearly between 2014 and 2020. Figure 1 shows the cumulative numbers for this period. The number of announcements varies between 10 and 13 per year. While before 2015 no coal divestment plans were announced, by the end of 2020, 68 major banks have announced plans to exit the coal sector (IEEFA, 2020).

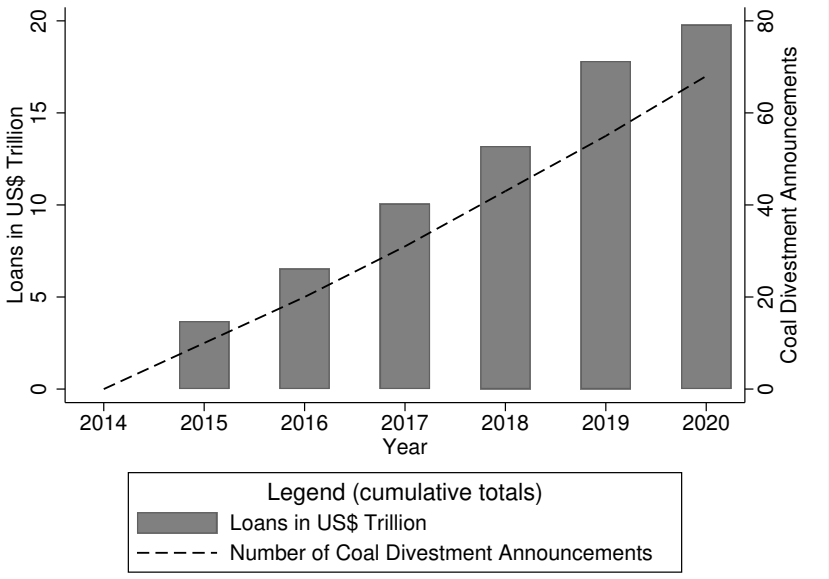


Figure 1: **Coal Divestment Announcements and Financial Impacts**

This figure presents the cumulative number of coal divestment announcements from 2014 to 2020 on the right axis. Additionally, the total loan volume granted to customers by the divesting banks is presented on the left axis to show the economical significance of the divestment movement. Loan volumes are derived from annual reports. For 2020, loan volumes from 2019 are used as no annual reports from 2020 are yet available.

Figure 1 shows that the recent divestment movement is real: 68 major banks have announced plans to exit the coal sector between 2015 and 2020. These banks manage loan books of nearly USD 20tn, or about 7.8% of global debt financing (Tiftik et al., 2020). Therefore, the divestment movement is also economically significant.
Section 4.1.1 provides an overview of the number of facilities, while section 4.1.2 examines the impact of coal divestment announcements on the number of coal industry facilities.

4.1.1 Overview: Number of Facilities

To analyse the overall impact of coal exit announcements, I first provide an overview of the number of facilities in this section.
In figure 2, I show that the total number of facilities in the Dealscan database increases between 2010 and 2019. While 11'360 loans are granted in 2010, the number of facilities increases to 18'049 in 2019. Until 2014, the number of coal industry facilities follows a similar path than the total number of facilities. Starting in 2015, a different trend for the number of coal industry facilities can be observed. While the total number of facilities in the Dealscan database stays relatively flat between 2015 and 2019, the number of coal industry facilities decreases within a year from 315 loans in 2014 to 257 loans in 2015. Thereafter, the curve continues to decline to 219 loans in 2019. As presented in figure 1, the coal divestment movement began in 2015. Figure 2 provides the first indication that divestment announcements could lead to a smaller number of loans granted to the coal sector.

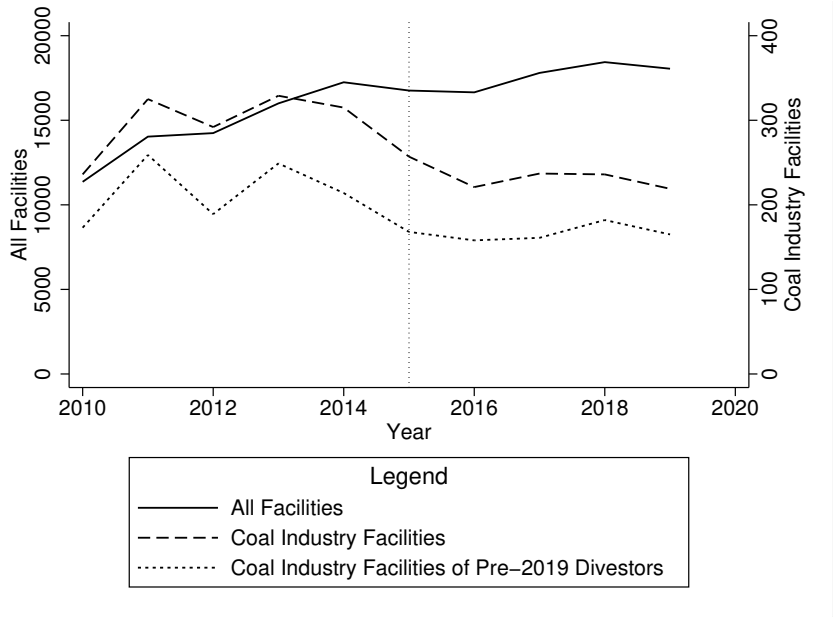


Figure 2: **Number of Facilities, Coal Industry Facilities and Divestor Facilities Before and After 2015**

This figure shows the time trend for the total number of facilities and coal industry facilities. Coal industry facilities include companies identified by the GCEL and Dealscan, see also section 3.1. Further, the number of coal industry facilities of divestors is shown. Facilities are counted as divestor facilities if at least one lender with a coal divestment announcement before 2019 is involved in the syndicated loan. The years 2010 to 2019 are included.

On average 299 total coal industry facilities and 217 pre-2019 divestor facilities per year (share of divestors: 73%) are observed between 2010 and 2014. On average 234 total coal industry facilities and 167 pre-2019 divestor facilities per year (share of divestors: 71%) are observed between 2015 and 2019.

I further show in figure 2 the number of pre-2019 divestor[11] facilities. The share of coal loans involving pre-2019 divestors remains relatively constant with 73% from 2010 to 2014 and 71% from 2015 to 2019. Divestors represent thus a large group of coal lenders. This is consistent with the fact that I can only analyse large divestors. I therefore conclude that banks with divestment announcements are primarily responsible for the declining number of coal industry facilities.

Figure 12 in Appendix B.1 shows a similar trend for coal mining facilities.

[11] Pre-2019 divestors are defined as lenders with a coal divestment announcement between 2015 and 2018. See section 3.2.2 for more information.

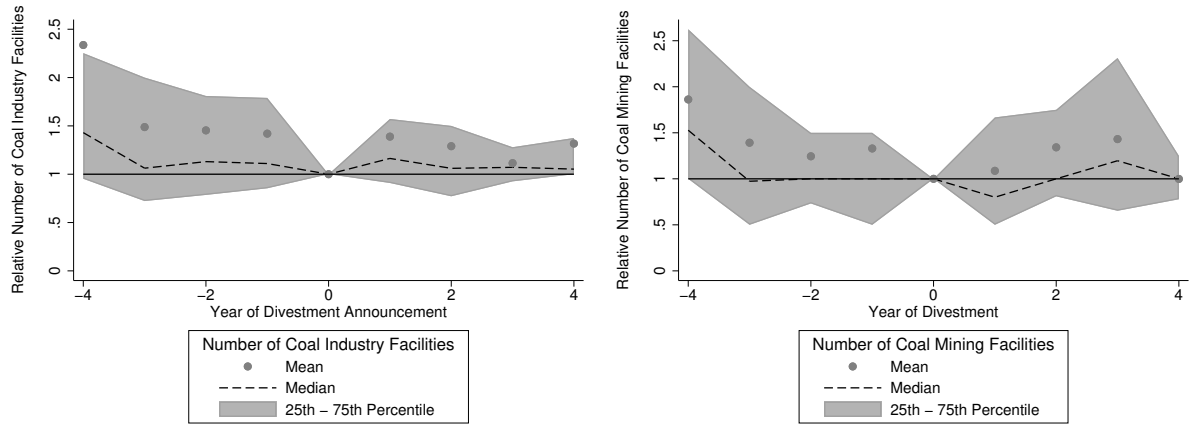
4.1.2 Coal Divestor Analysis

After showing that the total number of coal loans is declining and that pre-2019 divestors are primarily responsible for this trend, I analyse in this section the time trend of coal facilities syndicated by pre-2019 divestors in more detail. I find that most divestors reduce their exposure to the coal sector in the year of the divestment announcement. However, divestors' exposure to the coal sector is not further reduced in subsequent years.

Figure 3 shows the number of coal facilities before and after the divestment announcement. The number of coal facilities is calculated relatively for each lender, compared to the year of the divestment announcement. The analysis period ranges from 4 years before to 4 years after the divestment announcement.

As shown in figure 3 (a), the mean number of coal industry facilities decreases from 2.3 in year -4 (4 years prior to the divestment announcement) to approximately 1.5 in the years -3 to -1. The mean number of coal industry facilities is fixed at 1 in the year of the divestment announcement (year 0). Therefore, the average lender reduces its number of coal industry facilities by over 50% between 4 and 3 years before the divestment announcement and then again by 50% in the year of the divestment announcement.

However, in the years after the divestment announcement, the mean number of coal industry facilities increases again: the mean number of coal facilities rises to 1.4 in year 1 (one year after the divestment announcement), partially offsetting the previous divestment effect. The mean remains above 1 in the entire period after the divestment announcement. Hence, on average, the number of coal industry facilities is the lowest in the year of the divestment announcement.



(a) Coal Industry Facilities

(b) Coal Mining Facilities

Figure 3: **Number of Coal Facilities Before and After the Divestment Announcement**

This figure shows the number of coal facilities, calculated relatively for each lender, compared to the year of the divestment announcement. The results are calculated separately for coal industry facilities in figure (a) and coal mining facilities in figure (b). The analysis period ranges from 4 years before to 4 years after the divestment announcement. The year of the respective divestment announcement is set as year 0. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020). Coal industry facilities include companies identified by the GCEL and by Dealscan, see also section 3.1.

To reduce the effect of extreme outliers, I also analyse in figure 3 (a) the median and 25th to 75th percentile of the number of coal industry facilities. The overall trend for the median lender is similar to the trend of the mean lender, with a 10% reduction in the number of coal industry facilities in the year of the divestment announcement. The median number of coal industry facilities also never falls below 1 and is thus the lowest in the year of the divestment announcement.

The results for coal mining facilities are similar to the results for coal industry facilities, as shown in figure 3 (b).

In addition to the number of coal facilities, I analyse the credit volume granted to the coal sector and find similar results: While the mean credit volume to the coal sector decreases by about 300% in the year of the divestment announcement, the median decreases

by about 20%. Moreover, also the credit volume increases again in the years after the divestment announcement (see figure 16 in Appendix B.2).

The results observed in figure 3 draw important implications for the efficacy of the coal divestment movement: In the short run, coal divestment announcements result in fewer loans to the coal sector, as both the mean and median number of coal facilities are the lowest in the year of the divestment announcement. Banks appear to be emphasising their commitment to exit the coal sector with a lower exposure to the coal sector. This could lead to lending constraints for the coal sector, as the credit volume (see figure 16 in Appendix B.2) and the total number of loans to the coal sector decline as well (see figure 2 in section 4.1.1). These lending constraints could be a useful method to curb coal production[12]. However, long-term lending limitations or a further reduction in the number of loans to the coal sector are not observed, as the mean and median number of coal industry facilities, as well as credit volumes, rise again in the years after the divestment announcement. This contradicts the banks' own commitments to limit lending to the coal sector and thus threatens the efficacy to curb coal production.

[12]E.g. Ansar et al. (2013) argue that lending constraints had a positive impact on the divestment movement against South Africa's apartheid regime.

4.2 Loan Spreads

After observing that the number of loans and loan volumes to coal companies decrease in the year of the coal divestment announcement and increase again in subsequent years, this section analyses loan spreads for coal companies and the impact of the coal divestment movement on loan spreads. Loan spreads are measured using the all-in-spread-drawn (AISD), which equals the loan spread over LIBOR plus the facility fee. I regress the dummy variables *CoalCompany* and *Pre2019Divestor* on the variable AISD and find that coal companies face lower loan spreads than other borrowers and divestors charge higher rates than non-divestors. However, the divestment movement has no significant impact on loan spreads. The results are presented in table 3.

Regression (1) in table 3 shows that the analysed divestors charge lower prices than non-divestors. The coefficient for *Pre2019Divestor* is -83.03, which is a reduction of 28.2% compared to the mean AISD of 297.3. The effect is statistically significant on the 0.1% significance level (t-value: -10.46). This could be explained by the fact that the analysed divestors are larger banks, as I only include large divestors in my analysis. However, the effect for loans to coal companies granted by divestors is smaller, with a decrease of 18.66 points (-83.83 for *Pre2019Divestor* + 65.17 for *CoalComp * Pre2019Div*). This effect is also statistically significant on the 0.1% significance level (t-value: 4.19 for *CoalComp * Pre2019Div*).

All control variables are statistically significant on the 0.1% significance level: Larger lenders - with higher total assets - and financially more stable lenders - with a higher return on equity and lower leverage - charge lower loan spreads. With a higher number of participants in a syndicated loan, the loan spread decreases. Loans with longer maturities are charged at a higher cost and a higher credit volume corresponds to a lower loan spread.

Table 3: **Effect of Coal Companies and Coal Divestors on Loan Spreads**

This regression table shows the difference in the loan spread between divestors and non-divestors for coal industry facilities before and after 2015. The endogenous variable AISD measures the loan spread per facility. CoalCompany is a dummy variable that equals 1 if the borrower is a coal company. Pre2019Divestor is a dummy variable that equals 1 if at least one lender with a divestment announcement before 2019 is involved in the facility. Post2015 is a dummy variable that equals 1 for the years 2015 to 2019. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.3. All regressions include fixed effects for year, country of syndication and loan type, as well as clustered Standard Errors for year, country of syndication and loan type. The years 2010 to 2019 are included. The average AISD is 297.3.

	(1)		(2)	
	AISD		AISD	
CoalCompany	-91.41***	(-5.69)	-118.8***	(-5.94)
Pre2019Divestor	-83.83***	(-10.46)	-76.70***	(-6.06)
CoalComp * Pre2019Div	65.17***	(4.19)	92.20***	(5.00)
Post2015			-55.24**	(-3.11)
Post2015 * CoalComp			50.96	(1.71)
Post2015 * Pre2019Div			-12.84	(-0.78)
CoalC * Pre2019Div * P2015			-50.39	(-1.76)
Total Assets (mUSD)	-0.000000471***	(-9.85)	-0.000000470***	(-9.66)
Leverage (%)	2.482***	(5.55)	2.480***	(5.55)
Return on Equity (%)	-1.902***	(-3.95)	-1.877***	(-3.94)
Credit Volume (mUSD)	-0.0219***	(-9.36)	-0.0219***	(-9.35)
Maturity (months)	0.462***	(4.44)	0.463***	(4.44)
Number of Lenders	-3.518***	(-15.90)	-3.518***	(-15.91)
Observations	63220		63220	
R^2	0.345		0.345	
Adjusted R^2	0.343		0.343	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

I analyse the effects of the recent coal divestment movement on loan spreads in regression (2). As the divestment movement has started in 2015, I include a dummy variable *Post2015* in regression (2). In both regressions, loan spreads charged to coal companies are lower than to other borrowers. In regression (2), the coefficient for *CoalCompany* is -118.8 and statistically significant on the 0.1% significance level (t-value: -5.94). In contrast to regression (1) where I find lower prices for divestors' coal facilities, regression (2) shows that the loan spread charged to coal companies is 15.50 points higher for divestors compared to non-divestors for the period from 2010 to 2014 (-76.70 for *Pre2019Divestor* + 92.20 for *CoalComp * Pre2019Div*) or 5.2% higher compared to the mean AISD of 297.3. The effect is statistically significant on the 0.1% significance level (t-values: -6.06 for *Pre2019Divestor* and 5.00 for *CoalComp * Pre2019Div*). However, the effects for divestors and coal borrowers on loan spreads after 2015 are not statistically significant on all common significance levels (t-values: 1.71 for *Post2015 * CoalComp*, -0.78 for *Post2015 * Pre2019Div* and -1.76 for *CoalC * Pre2019Div * P2015*). All control variables remain stable compared to regression (1).

The results in table 3 show that the analysed divestors charge higher prices to coal companies compared to non-divestors. Between 2010 and 2014, banks with a future divestment announcement charge 5.2% higher loan rates for coal industry facilities compared to non-divestors. This is consistent with the conclusion of Delis et al. (2019) that banks with a higher focus on environmental standards also charge higher loan rates to fossil fuel firms. Even if divestors do not exit the coal sector entierly after 2015 (see section 4.1.2), divestors seem to be more aware of climate risks as they charge higher loan spreads to coal companies. However, the other results presented in table 3 differ from the conclusions of Delis et al. (2019) that fossil fuel firms exposed to stricter climate policies face higher credit costs only after 2015. When analysing loans to the coal sector after 2015, I find no statistical evidence that the climate policy risk, which could be included in credit prices, changed. As a result, no significant effects are observed for coal companies after 2015. The difference in the loan spread between divestors and non-divestors already exists for the observed period before 2015. This discrepancy could be explained by the fact that the results of Delis et al. (2019) are conducted for fossil fuel companies and not specifically for coal companies. Delis et al. (2019) even mention that coal had already been partly discarded before 2015, which would be consistent with the finding that the difference

between divestors and non-divestors in prices charged to coal companies already exists before 2015.

The results in table 3 show that loan rates for coal companies do not increase significantly after 2015. As coal divestors do not exit the coal sector entirely, the reduction in the supply of coal loans seems to be too small to lead to higher loan rates for coal facilities. I therefore do not find a direct impact of the recent divestment movement on coal loan spreads.

Table 9 in Appendix B.3 compares loan spreads before and after divestment announcements. No significant pricing effects can be observed. This confirms the finding that the analysed divestors charge higher loan rates in general, independent of the exact time before or after the divestment announcement.

However, this finding could be misleading, as I only include large divestors[13] in my analysis. The effect I measure for divestors could instead be the effect for large lenders. The missing small divestors could charge higher credit prices, which is supported by the fact that the coefficient for total assets in table 3 is negative and statistically significant on the 0.1% significance level. If smaller divestors would charge higher loan rates, the coefficients in table 3, including *Pre2019Divestor*, would be underestimated.

In addition, the results for coal mining companies are presented in table 6 in Appendix B.1. However, because only a small number of coal mining facilities can be observed for non-divestors, the results for coal mining facilities may be inaccurate.

[13] I only include large divestors due to the fact that the IEEFA (2020) collects divestment announcements only from banks with assets under management or loans outstanding in excess of USD 10bn.

4.3 Sustainability Scores

This section shows that even if divestors continue to participate in coal industry facilities and no significant effects on loan spreads related to the recent coal divestment movement can be observed, coal companies receive higher social and governance scores after 2015. In addition, I find a correlation between divesting from coal and receiving a higher SG score.

Section 4.3.1 presents the effects for coal industry facilities of divestors with a divestment announcement between 2015 and 2018, while section 4.3.2 examines coal industry facilities from divestors before and after their respective divestment announcement.

Figure 4 analyses two different sustainability scores from 2010 to 2019. The banking coal policy score is part of an analysis by the Rainforest Action Network (2020) to analyse patterns in bank financing for the coal industry. The average banking coal policy score per coal industry facility decreases by an average of 1.11 points per year between 2010 and 2019. The effect is statistically significant on the 0.1% significance level (t-value: 6.17) and decreases linearly from a score of 50.7 in 2010 to 43.0 in 2019.

The SG score is calculated as the average of the social and governance score. The average SG score per coal industry facility increases by 0.52 points per year between 2010 and 2019. This increase is also statistically significant on the 5% significance level (t-value: 2.37). However, the rise of the average SG score does not follow a linear path. Starting in 2010 from a score of 71.0, the score decreases to 66.7 in 2014. Between 2015 and 2019, the average SG score of a coal industry facility increases by 5.4% with a score of 70.0 in 2015 and 73.8 in 2019. An increasing SG score and a decreasing banking coal policy score can also be observed for coal mining facilities, as shown in figure 13 in Appendix B.1.

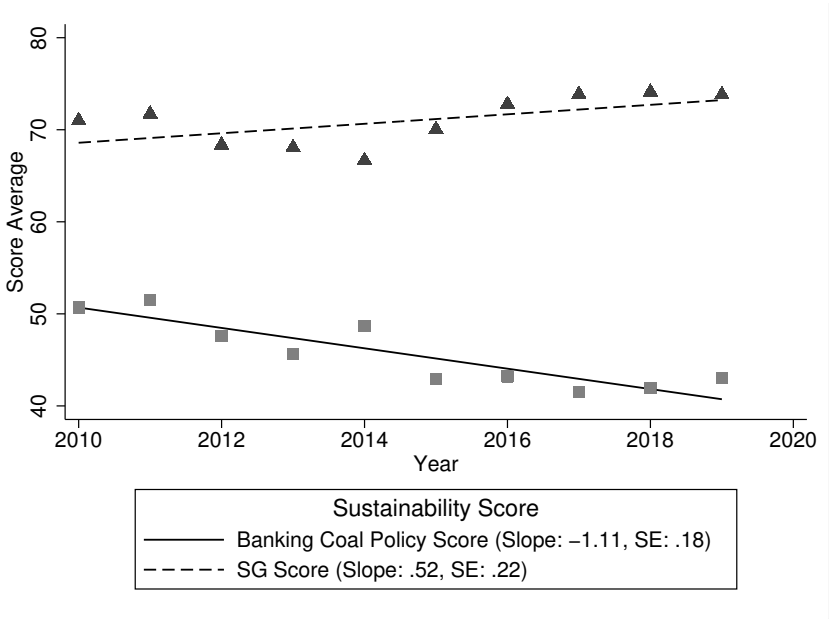


Figure 4: **Sustainability Scores of Coal Industry Facilities**

This figure shows two different trends for average sustainability scores of coal industry facilities between 2010 and 2019. The average scores are calculated per coal industry facility and weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. The SG score is reported by Thomson Reuters Eikon (2017), scaled from 0 to 100. The banking coal policy score is reported by the Rainforest Action Network (2020). I calculate score deciles and then rescale the banking coal policy score by a factor of 10 for comparability. Thus, 100 points is the maximum for both scores. Both regressions include yearly clustered Standard Errors.

Both curves in figure 4 show a clear but contradictory trend: While the average SG score decreases until 2014 and then increases again until 2019, the average banking coal policy score decreases linearly from 2010 to 2019. One reason for this difference could be that the banking coal policy score penalises banks that are still investing in the coal industry. Banks receive a higher coal policy score when they divest from the coal industry and only banks with lower scores remain in the coal sector. Therefore, the decreasing trend of the banking coal policy score is to be expected.

On the other hand, there is no clear relationship between the coal loans a bank grants and the SG score a bank receives. Although the overall trend for the average SG score of coal industry facilities is positive and significant between 2010 and 2019, a disruption in 2015 can be observed: The average SG score declines before 2015 and increases again after

2015. This pattern could be explained by the coal divestment movement. As observed in figure 1 in section 4.1, the first coal exit plans were announced in 2015. Figure 2 in section 4.1.1 further shows that the number of coal industry facilities begins to decline in 2015. These trends are happening at the same time as the average SG score starts to rise, as shown in figure 4. Before 2015, banks were penalised for investing in the coal industry. After 2015, they receive higher SG scores as they announce to exit from the coal industry. A positive impact of announcing coal divestment plans on environmental scores would be more intuitive, as a smaller number of loans to the coal sector should curb the global coal production and should thus improve the environmental protection. But the rising SG score identifies a correlation between coal divestment announcements and social and governance scores. I show in figure 10 in Appendix A.2 that the average ESG scores and SG scores of coal industry facilities are similar between 2010 and 2019. Therefore, SG scores and ESG scores appear to be similarly affected by the coal divestment movement.

4.3.1 SG Scores of Pre-2019 Divestors

In this section, I compare SG scores of pre-2019 divestors and non-divestors to further analyse the relationship between the coal divestment movement and SG scores. Divestors are identified as companies that have announced plans to exit the coal sector before 2019. I find that the average SG score differs between divestors and non-divestors, but the causal effects remain unclear. Figure 5 shows the average SG scores of pre-2019 divestors and non-divestors between 2010 and 2019.

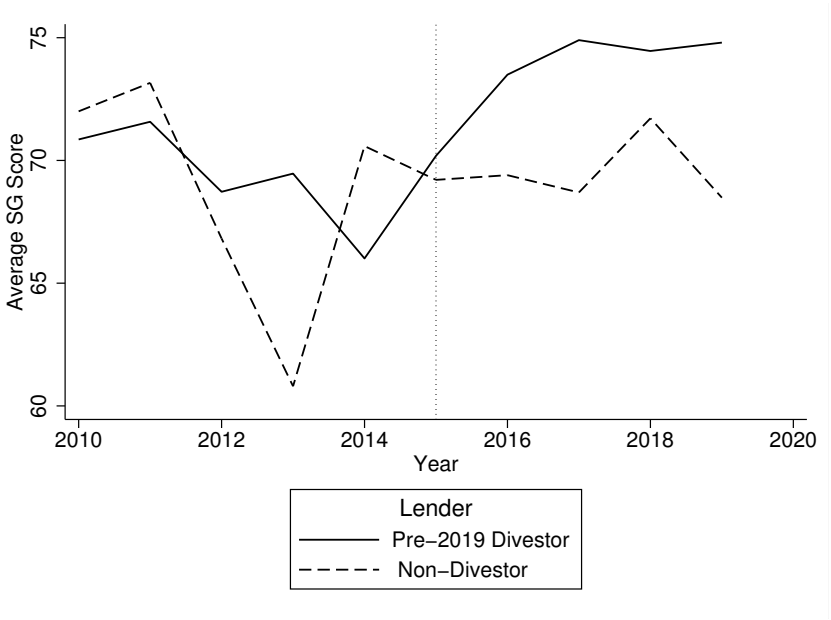


Figure 5: **SG Scores of Pre-2019 Divestors compared to Non-Divestors Before and After 2015**

This figure shows the average SG score per coal industry facility, comparing pre-2019 divestors (if at least one lender with a coal divestment announcement before 2019 is involved in the facility) and non-divestors. The average SG score per coal industry facility is weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Only coal industry facilities are analysed. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

Figure 5 shows that both curves behave non-linearly between 2010 and 2014. The curve for non-divestors has an outlier in 2013 but overall, the two groups receive similar SG scores before 2015. After 2015, SG scores of divestors and non-divestors differ substantially. The curve for non-divestors remains relatively flat with a score of around 70 between 2015 and 2019. However, the average SG score of divestors rises sharply to 73.5 in 2016 and increases further to a score of 74.8 in 2019. Between 2015 and 2019, the average SG score of divestors increases thus by 6.6%.

In general, it can be concluded that the average SG score of coal industry facilities starts to increase in 2015. Between 2015 and 2019, the average SG score of a coal industry facility increases by 5.4%, as presented in figure 4. Figure 5 shows that this trend is driven by divestors, as the average SG score of divestors increases by 6.6% between 2015 and 2019.

SG scores for divestors increase not only in absolute numbers but also in relative terms, compared to non-divestors, as the gap between the two curves widens. Thus, I find a correlation between divesting from coal and receiving a higher SG score.

To analyse the correlation between divesting from coal and receiving a higher SG score in more detail, I regress the dummy variable *Pre2019Divestor* on the variable *SGScore*. I find that the difference in SG scores between divestors and non-divestors is statistically significant when control variables for lender characteristics and fixed effects for year and country of syndication are included. The results are presented in table 4.

Table 4: **Effect of Pre-2019 Divestors on SG Scores**

This regression table shows the difference in the SG score between pre-2019 divestors and non-divestors for coal industry facilities before and after 2015. The endogenous variable SGScore measures the average SG score per coal industry facility, weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Pre2019Divestor is a dummy variable that equals 1 if at least one lender with a divestment announcement before 2019 is involved in the facility. Post2015 is a dummy variable that equals 1 for the years 2015 to 2019. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.4. Both regressions include clustered Standard Errors for year and country of syndication. Regression (2) includes fixed effects for year and country of syndication. The average SG score is 70.79. Only coal industry facilities are analysed.

	(1)		(2)	
	SGScore		SGScore	
Pre2019Divestor	1.938	(0.99)	-5.300***	(-3.84)
Post2015	1.993	(0.81)	-0.493	(-0.31)
Post2015 * Pre2019Div	2.192	(0.86)	3.635*	(2.40)
Total Assets (mUSD)			-1.85e-08**	(-2.83)
Leverage (%)			0.115	(1.27)
Return on Equity (%)			-0.559***	(-5.92)
Observations	2253		2253	
R^2	0.063		0.391	
Adjusted R^2	0.062		0.374	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Regression (1) shows that only statistically insignificant results can be observed when no control variables and no fixed effects are included. Controlling for lender characteristics and including fixed effects for year and country of syndication in regression (2), I find a statistically significant difference between the SG scores of divestors and non-divestors. For the period from 2010 to 2014, the average SG score of divestors is 5.3 points lower compared to non-divestors, a reduction of 7.5% compared to the mean SG score of 70.79. The effect is statistically significant on the 0.1% significance level (t-value: -3.84). For the period from 2015 to 2019, divestors receive higher SG scores than from 2010 to 2014 but still lower SG scores than non-divestors. The average SG score of divestors is 1.665 points lower than for non-divestors (-5.3 for *Pre2019Divestor* + 3.635 for *Post2015 * Pre2019Div*), a reduction of 2.4% compared to the mean SG score of 70.79. This effect is statistically significant on the 5% significance level (t-value: 2.40 for *Post2015 * Pre2019Div*).

While the share of leverage has no statistically significant effect on the SG score, a higher level of total assets and a higher return on equity are negatively and statistically significantly correlated with the SG score.

I observe in table 4 a statistically significant difference between the SG score of divestors and non-divestors when controlling for lender characteristics and fixed effects for year and country of syndication in regression (2). A disruption after 2015 is observable in table 4 as well as figure 5, which is aligned with the start of the coal divestment movement and also the Paris Agreement in 2015. Both table 4 and figure 5 observe an increase in the SG score of divestors when comparing the post-2015 period with the pre-2015 period. In contrast to the trend observed in figure 5 that the analysed divestors obtain higher SG scores compared to non-divestors after 2015, table 4 shows that the analysed divestors, controlling for lender characteristics and fixed effects for year and country of syndication in regression (2), obtain lower SG scores compared to non-divestors.

One possible explanation for the rising SG score of divestors for the post-2015 period could be that investing in coal is correlated with lower SG scores. Due to divestors' high exposure to the coal sector[14], divestors receive lower SG scores compared to non-divestors prior to 2015. After they start to divest in 2015, their exposure to the coal sector is

[14]See in figure 2 in section 4.1.1 that the analysed divestors are among the largest coal lenders. This is aligned with the fact that the IEEFA (2020) collects divestment announcements only from large banks.

reduced (figure 3 in section 4.1.2) and thus their SG scores increase compared to non-divestors.

In addition, the results in table 4 reject the possibility that companies with higher SG scores are more likely to exit the coal sector: Before they begin to divest, divestors receive lower SG scores compared to non-divestors in the period from 2010 to 2014.

To conclude the results of this section, I find a relationship between the coal divestment movement and increasing SG scores after 2015: The first coal exit plans were announced in 2015 (figure 1 in section 4.1) and the number of coal industry facilities declines after 2015 (figure 2 in section 4.1.1). As a result of their coal exit plans, divesting banks appear to receive higher SG scores (figure 5 and table 4) after 2015. Since companies do not completely exit the coal sector after their coal divestment announcements (figure 3 in section 4.1.2), higher average SG scores can be observed after 2015 in figure 4 in section 4.3. However, I do not find evidence that lenders which persistently invest in coal receive lower SG scores than divestors: Regression (2) in table 4 shows that, controlling for lender characteristics and fixed effects for year and country of syndication, the average SG score of divestors is lower than for non-divestors.

4.3.2 SG Scores Before and After Divestment Announcements

Complementing section 4.3.1, where divestors are defined as companies that announced plans to exit the coal sector between 2015 and 2018, I compare in this section the SG scores before and after the divestment announcements and find mixed results regarding the causal effect of announcing to exit the coal sector on SG scores[15].

[15] In this section, I analyse SG scores on the company level instead of on the aggregated facility level as done in section 4.3.1. Because I cannot control for lender fixed effects when analysing the SG score on the aggregated facility level, the results could be inaccurate as a lender can become a divestor if the lender announces to exit from the coal sector. The sample would therefore not be balanced. The results of this section, but analysed on the facility level are shown in Appendix B.4.

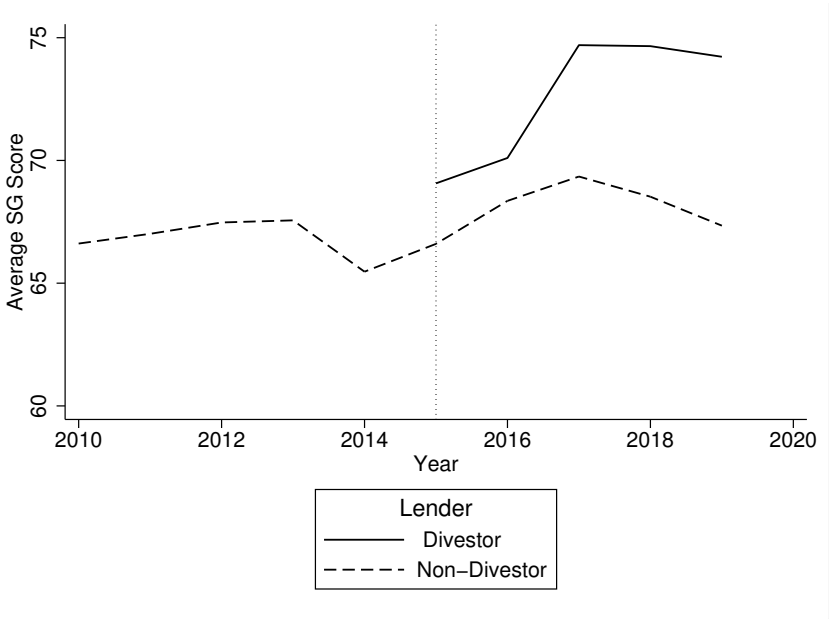


Figure 6: **SG Scores of Divestors compared to Non-Divestors**

This figure shows the average SG score comparing coal divestors after the respective divestment announcement and non-divestors. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

As shown in figure 6, the average SG score of non-divestors stays relatively flat between 2010 and 2015 with a score of 66.6 in both 2010 and 2015. For divestors, the average SG score in 2015 is 69.1 and thus 2.5 points or 3.8% higher compared to non-divestors. Divestors receive higher SG scores than non-divestors throughout the period from 2015 to 2019. In 2019, divestors receive an average SG score of 74.2 and non-divestors a score of 67.3 points. The gap between the two groups is therefore 6.9 points or 10.2% in 2019. Increasing average SG scores for divestors could be explained by the coal divestment movement: Companies with a divestment announcement receive higher SG scores, mirroring the results shown in figure 5 in section 4.3.1. While the average SG scores increase for both groups after 2015, the annual increase for divestors is larger than for non-divestors. The gap between the two groups more than doubles from 2.5 points or 3.8% in 2015 to a difference of 6.9 points or 10.2% in 2019. Therefore, SG scores for divestors increase not only in absolute numbers, but also in relative terms compared to non-divestors. To test the statistical significance of the difference in the average SG score between divestors and non-divestors, I regress the dummy variable *Divestor* on the variable *SGScore*.

As shown in table 5, when including no control variables for lender characteristics and no fixed effects in regression (1), I find that the average SG score of divestors is statistically significantly higher compared to non-divestors. Divestors receive on average 6.268 points higher SG scores compared to non-divestors. This is an increase of 9.1% compared to the mean SG score of 68.58. The coefficient is statistically significant on the 0.1% significance level (t-value: 5.08) and mirrors the result presented in figure 6 that the analysed divestors receive higher SG scores than non-divestors.

Table 5: **Effect of the Coal Divestment Movement on SG Scores**

This regression table shows the difference in the SG score between divestors and non-divestors. The endogenous variable SGScore measures the average SG score per lender. Divestor is a dummy variable that equals 1 if the lender has made a coal divestment announcement previously. The years 2015 to 2019 are analysed, as the first coal divestment announcements were made in 2015. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.4. All regressions include clustered Standard Errors for year and lender. Regression (2) includes yearly fixed effects, regression (3) includes fixed effects for year and lender. The average SG score is 68.58.

	(1) SGScore		(2) SGScore		(3) SGScore	
Divestor	6.268***	(5.08)	3.008	(1.72)	0.343	(0.33)
Total Assets (mUSD)			1.39e-08*	(2.23)	5.75e-08***	(3.35)
Leverage (%)			0.214***	(3.78)	0.0711	(0.82)
Return on Equity (%)			-0.294***	(-4.60)	-0.00593	(-0.12)
Observations	657		656		656	
R^2	0.026		0.092		0.833	
Adjusted R^2	0.025		0.073		0.811	
Year FE	No		Yes		Yes	
Lender FE	No		No		Yes	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Controlling for lender characteristics and including yearly fixed effects in regression (2), I find a smaller, positive but not statistically significant coefficient for *Divestor*. Total assets and the share of leverage have a positive and statistically significant effect on the average SG score. A negative and statistically significant effect can be observed for the return on equity.

After the additional inclusion of lender fixed effects[16] in regression (3), the coefficient for *Divestor* is even smaller but still positive. The coefficient remains statistically insignificant.

Thus, the results regarding the difference in SG scores between divestors and non-divestors remain mixed: Table 4 in section 4.3.1 shows that the analysed divestors receive on average 1.665 points lower SG scores compared to non-divestors between 2015 and 2019, a reduction of 2.4% compared to the mean SG score. However, a positive but not statistically significant effect is observed in table 5 when including lender characteristics and fixed effects. This could be explained by the fact that the analysed divestors differ from non-divestors, but not depending on their exact year of divestment: Table 4 in section 4.3.1 counts all facilities from pre-2019 divestors as divestor facilities, even before the respective divestment announcement. In contrast, table 5 analyses the difference in SG scores before and after the respective divestment announcement.

To analyse the SG scores of divestors in more detail, I show the time trend of divestors' SG scores relative to the year of their respective divestment announcement in figure 7. The analysis period ranges from 4 years before to 4 years after the divestment announcement. The mean SG score of divestors is 0.94 in year -4 (4 years prior to the divestment announcement) and 0.98 in year -1. The mean SG score of divestors is fixed at 1 in the year of the divestment announcement (year 0). In subsequent years, the mean SG score of divestors rises steadily to 1.05 in year 4 (four years after the divestment announcement). The median SG score increases similarly.

[16] The inclusion of lender fixed effects is crucial, as the R^2 and Adjusted R^2 increase sharply. This could be explained by the fact that the SG score of a lender in a certain year is strongly correlated with the SG scores of the previous years.

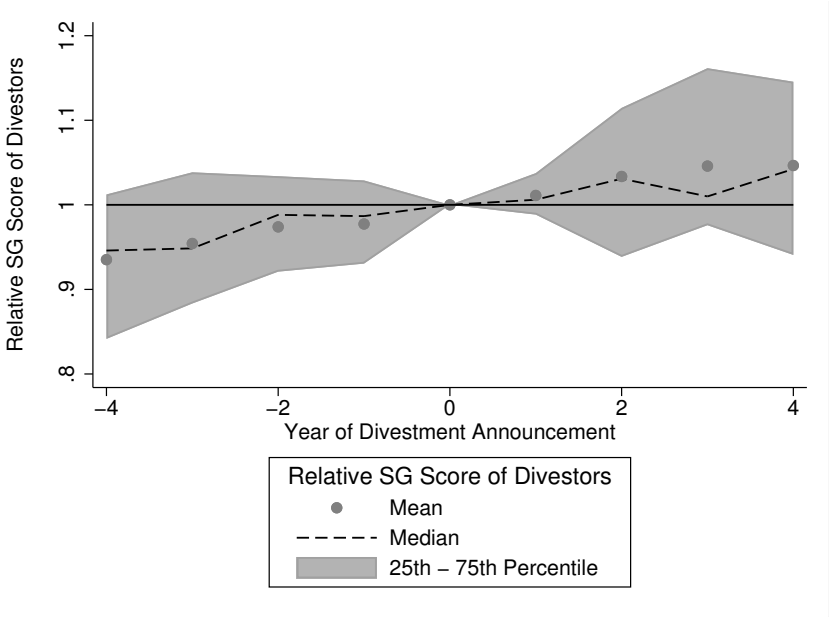


Figure 7: **SG Scores of Divestors Before and After Divestment Announcements**

This figure shows the SG score, calculated relatively for each divestor, compared to the year of the divestment announcement. The analysis period ranges from 4 years before to 4 years after the divestment announcement. The year of the respective divestment announcement is set as year 0. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020).

As shown in figure 7, the mean and median SG scores of divestors increase in the year of the divestment announcement. Divestment announcements could therefore directly increase the SG score. However, the mean and median SG score increases further in the years after the divestment announcement. Divestors obtain increasing SG scores over the entire period. I find a similar trend for ESG scores (see figure 11 in Appendix A.2).
To conclude the analysis of sustainability scores, I find that divestors' SG scores increase over time. Furthermore, all but one result show that the analysed divestors receive higher SG scores compared to non-divestors: I show this trend for divestors with a divestment announcement before 2019 compared to non-divestors in section 4.3.1, as well as when I compare lenders before and after the respective divestment announcement in section 4.3.2.

However, the results in table 5 contradict this trend as I find no statistically significant difference in the SG score between divestors and non-divestors. Moreover, figure 7 shows that higher SG scores for divestors could also be related to a time trend instead of a one-time increase due to the decision to exit the coal sector: The mean and median SG scores of divestors not only increase in the year of the respective divestment announcement but also in subsequent years. However, increasing SG scores do not appear to be directly caused by a decreasing exposure to the coal sector as divestors' number of coal facilities increases again in the years after the divestment announcement (see figure 3 in section 4.1.2). As a result, due to the inconsistency of the results, it remains unclear whether the divestment decision has a causal impact on SG scores.

5 Conclusion

The recent coal divestment movement is real and economically significant: From 2015 to 2020, 68 coal divestment plans were announced by major banks managing loan books of nearly USD 20tn, representing 7.8% of global debt financing.

I find evidence that the number of syndicated loans to coal companies declines after 2015. This trend is largely driven by lenders that have announced plans to divest from the coal sector. Furthermore, I show that the analysed divestors substantially reduce their coal exposure in the year of their divestment announcement: The number of loans to the coal sector declines on average by 50%. In subsequent years, however, the number of loans to the coal sector increases again by 40%, partially offsetting the previous divestment effect.

I discover that banks with a future divestment announcement charge 5.2% higher loan rates for coal industry facilities compared to non-divestors for the period from 2010 to 2014. One explanation for this difference could be that banks with a higher focus on environmental standards also charge higher loan rates for climate policy risks, as Delis et al. (2019) show for fossil fuel firms. However, I do not find a direct effect of the recent divestment movement on coal loan spreads, as no significant effects can be observed for the post-2015 period. Thus, I find no statistical evidence that the climate policy risk, which could be included in credit prices, has changed after 2015. This finding is in contrast to the results of Delis et al. (2019) for fossil fuel firms. In order to find more evidence that the coal sector behaves differently than the overall fossil fuel sector, further research on prices charged to coal companies should also include smaller divestors.

Moreover, I show that the social and governance scores of coal lenders increase by 5.4% between 2015 and 2019. Social and governance scores of divestors increase in the year of the respective divestment announcement but also in subsequent years. Having shown that there is a correlation between being a divestor and receiving higher social and governance scores, more research in this area is needed to confirm causal implications.

It would be interesting to analyse the impact of coal divestment announcements on capital costs in more detail. Given that the recent divestment movement only began in 2015 and is still ongoing, a longer period of analysis could allow further conclusions to be drawn about the impact on industry structure and contribute, thus, to a higher efficacy of debt divestment to curb coal production.

A Appendix A: Data Validation

A.1 Equal Allocation

All results in this paper are calculated using the following approach: As usually more than one lender is involved in a syndicated loan facility, all lender-dependent variables are weighted relatively to the lender's share of contribution to the loan. This bank allocation is reported by Dealscan for 29.5% of all facilities. Where the bank allocation is not reported, an equal allocation across all lenders is assumed.

This Appendix shows that the results are robust to using an equal allocation across all lenders rather than the bank allocation reported by Dealscan.

The average SG score per coal industry facility is identical for both bank allocation and equal allocation, as shown in figure 8.

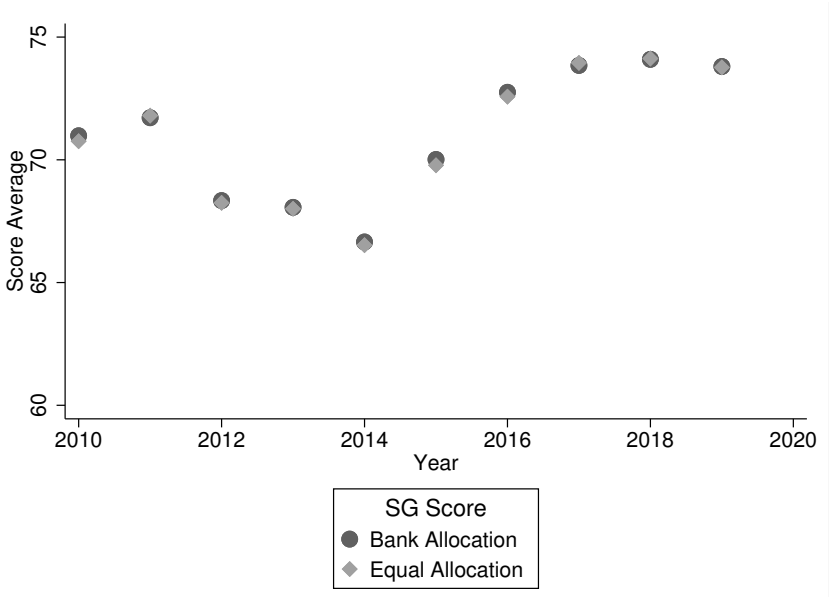


Figure 8: **SG Scores of Coal Industry Facilities for Bank Allocation and Equal Allocation**

This figure shows the average SG score of a bank allocation-weighted lender contribution compared to an equal allocation-weighted lender contribution. The bank allocation is reported by Dealscan for 29.5% of all facilities. Where the bank allocation is not reported, an equal allocation across all lenders is assumed. Only coal industry facilities are analysed. The years 2010 to 2019 are included.

Comparing the average SG scores of pre-2019 coal divestors, I find little difference between the two allocation methods, as shown in figure 9.

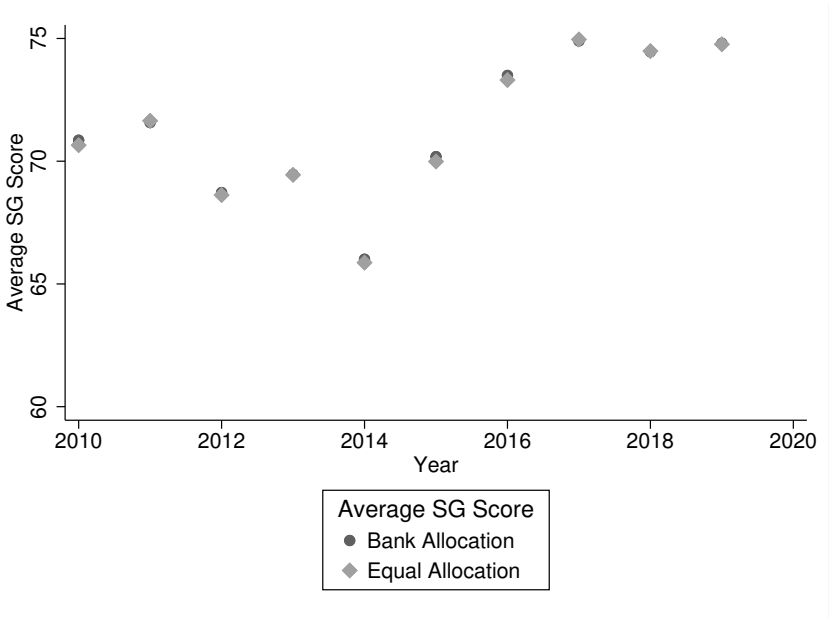


Figure 9: **SG Scores of Divestor Facilities for Bank Allocation and Equal Allocation**

This figure shows the average SG score of a bank allocation-weighted lender contribution to the loan compared to an equal allocation-weighted lender contribution. The bank allocation is reported by Dealscan for 29.5% of all facilities. Where the bank allocation is not reported, an equal allocation across all lenders is assumed. Only coal industry facilities are analysed. Facilities are counted as divestor facilities if at least one lender with a coal divestment announcement before 2019 is involved in the syndicated loan. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

A.2 Sustainability Scores

Figure 10 shows that the average ESG scores and SG scores follow a similar path for coal industry facilities between 2010 and 2019. I therefore use the SG score in my main analysis as the social and governance score should be independent from coal divestment announcements, whereas environmental scores should be negatively correlated with investing in the coal sector.

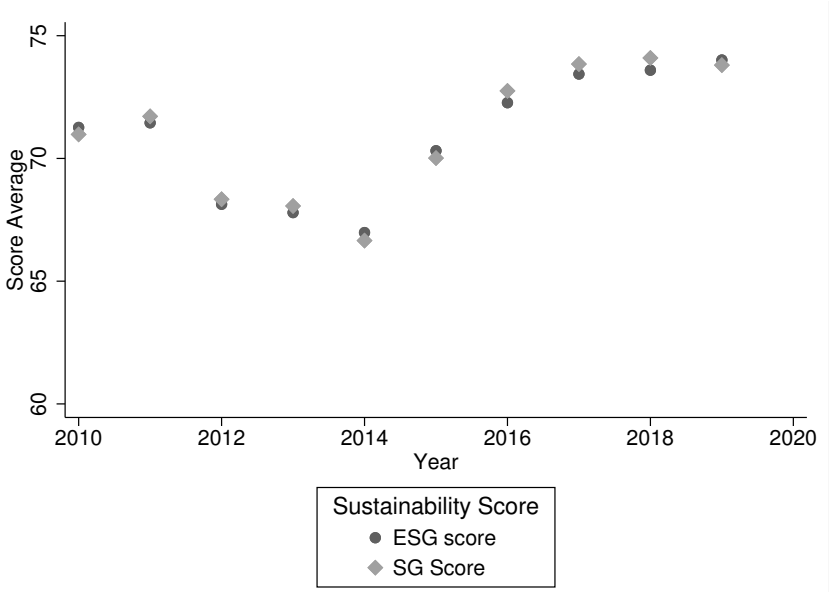


Figure 10: **ESG and SG Scores of Coal Industry Facilities**

This figure shows the average SG score and ESG score of coal industry facilities between 2010 and 2019. The average scores are calculated per coal industry facility and weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information.

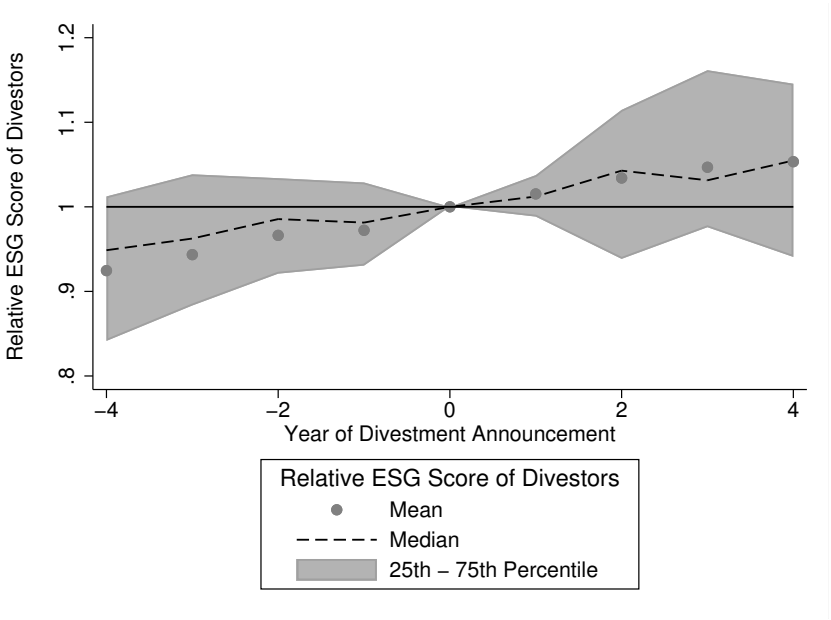


Figure 11: **ESG Scores of Divestors Before and After Divestment Announcements**

This figure shows the ESG score, calculated relatively for each divestor, compared to the year of the divestment announcement. The analysis period ranges from 4 years before to 4 years after the divestment announcement. The year of the respective divestment announcement is set as year 0. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020).

B Appendix B: Graphs

B.1 Coal Mining Facilities

I present in figure 12 that mostly banks with divestment announcements before 2019 are responsible for the decreasing number of coal mining facilities, as the two curves behave similarly and divestors are thus responsible for almost all coal mining facilities. Divestors are defined as banks with a divestment announcement between 2015 and 2018.

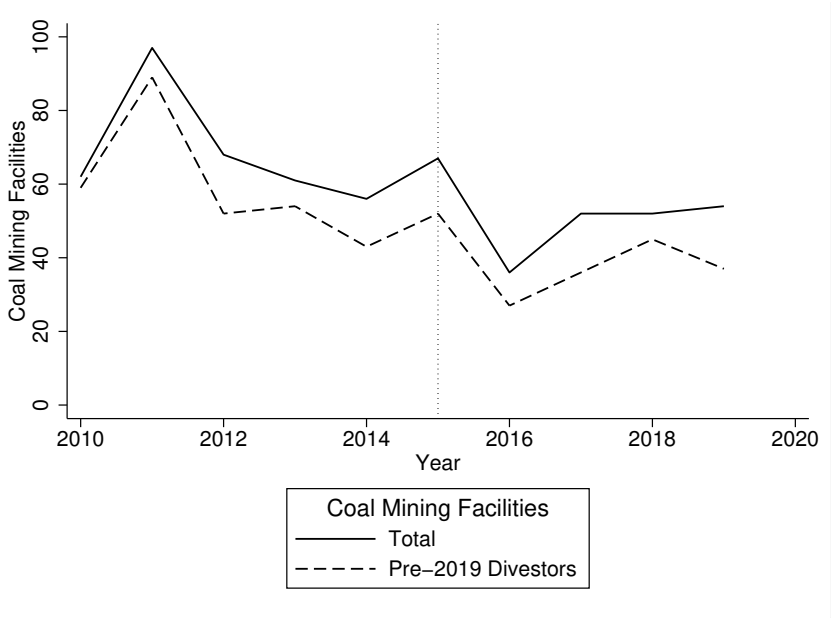


Figure 12: **Number of Coal Mining Facilities and Divestor Facilities Before and After 2015**

This figure shows the time trend for the number of coal mining facilities. Further, the number of coal mining facilities of divestors is shown. Facilities are counted as divestor facilities if at least one lender with a coal divestment announcement before 2019 is involved in the syndicated loan. The years 2010 to 2019 are included.

Table 6 analyses loan spreads for coal mining companies and the effect of coal divestment announcements on the cost of loans. I regress the dummy variables *CoalMiningCompany* and *Pre2019Divestor* on the AISD (all-in-spread-drawn) variable.
However, as only a small number of coal mining facilities from non-divestors can be observed, the results could be inaccurate.

Table 6: **Effect of Coal Mining Borrowers and Coal Divestors on Loan Spreads**

This regression table shows the difference in the loan spread between divestors and non-divestors for coal mining facilities before and after 2015. The endogenous variable AISD measures the loan spread per facility. CoalMiningCompany is a dummy variable that equals 1 if the borrower is a coal mining company. Pre2019Divestor is a dummy variable that equals 1 if at least one lender with a divestment announcement before 2019 is involved in the facility. Post2015 is a dummy variable that equals 1 for the years 2015 to 2019. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.3. All regressions include fixed effects for year, country of syndication and loan type, as well as clustered Standard Errors for year, country of syndication and loan type. The years 2010 to 2019 are included.

	(1) AISD		(2) AISD	
CoalMiningCompany	-16.39	(-0.80)	-90.73***	(-4.37)
Pre2019Divestor	-83.17***	(-10.36)	-75.70***	(-5.96)
CoalMComp * Pre2019Div	58.66**	(2.80)	131.0***	(5.87)
Post2015			-54.24**	(-3.06)
Post2015 * CoalMComp			89.34**	(3.06)
Post2015 * Pre2019Div			-13.46	(-0.82)
CoalMComp * Pre2019D * P2015			-84.47**	(-2.61)
Total Assets (mUSD)	-0.000000478***	(-10.04)	-0.000000477***	(-9.85)
Leverage (%)	2.461***	(5.51)	2.458***	(5.51)
Return on Equity (%)	-1.922***	(-3.99)	-1.901***	(-3.99)
Credit Volume (mUSD)	-0.0220***	(-9.37)	-0.0220***	(-9.35)
Maturity (months)	0.465***	(4.46)	0.465***	(4.45)
Number of Lenders	-3.578***	(-16.10)	-3.579***	(-16.11)
Observations	63220		63220	
R^2	0.345		0.345	
Adjusted R^2	0.343		0.343	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

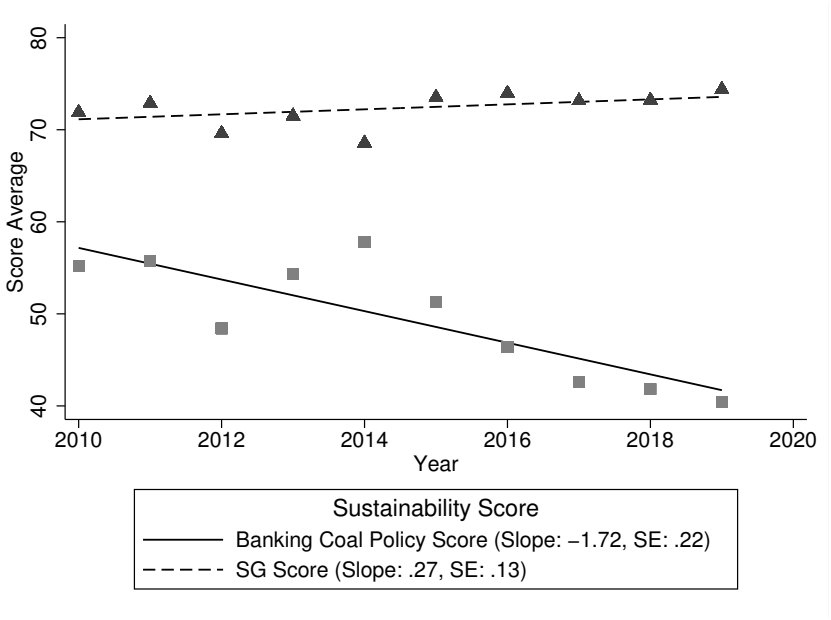


Figure 13: **Sustainability Scores of Coal Mining Facilities**

This figure shows two different trends for sustainability scores for coal mining facilities between 2010 and 2019. The average scores are calculated per coal mining facility and weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. The SG score is reported by Thomson Reuters Eikon (2017), scaled from 0 to 100. The banking coal policy score is reported by the Rainforest Action Network (2020). I calculate score deciles and rescale the banking coal policy score by a factor of 10 for comparability. Thus, 100 points is the maximum for both scores. Both regressions include yearly clustered Standard Errors.

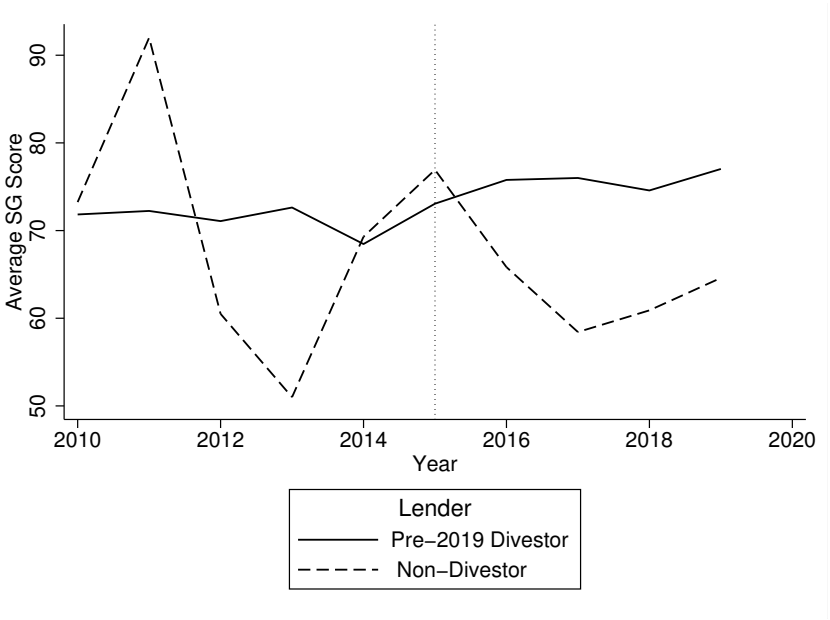


Figure 14: **SG Scores of Pre-2019 Divestors compared to Non-Divestors Before and After 2015**

This figure shows the average SG score per coal mining facility, comparing pre-2019 divestors (if at least one lender with a coal divestment announcement before 2019 is involved in the facility) and non-divestors. The average SG score per coal mining facility is weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Only coal mining facilities are analysed. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

Table 7: **Effect of Coal Divestors on SG Scores**

This regression table shows the difference in the SG score between pre-2019 divestors and non-divestors for coal mining facilities before and after 2015. The endogenous variable SGScore measures the average SG score per coal mining facility, weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Pre2019Divestor is a dummy variable that equals 1 if at least one lender with a divestment announcement before 2019 is involved in the facility. Post2015 is a dummy variable that equals 1 for the years 2015 to 2019. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.4. Both regressions include clustered Standard Errors for year and country of syndication. Regression (2) includes fixed effects for year and country of syndication. Only coal mining facilities are analysed.

	(1)		(2)	
	SGScore		SGScore	
Pre2019Divestor	4.534	(0.65)	-5.631	(-1.09)
Post2015	-1.438	(-0.17)	3.125	(0.62)
Post2015 * Pre2019Div	5.015	(0.60)	1.422	(0.29)
Total Assets (mUSD)			-5.48e-08***	(-3.87)
Leverage (%)			-0.0678	(-0.83)
Return on Equity (%)			-0.344*	(-2.24)
Observations	547		547	
R^2	0.089		0.468	
Adjusted R^2	0.084		0.434	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

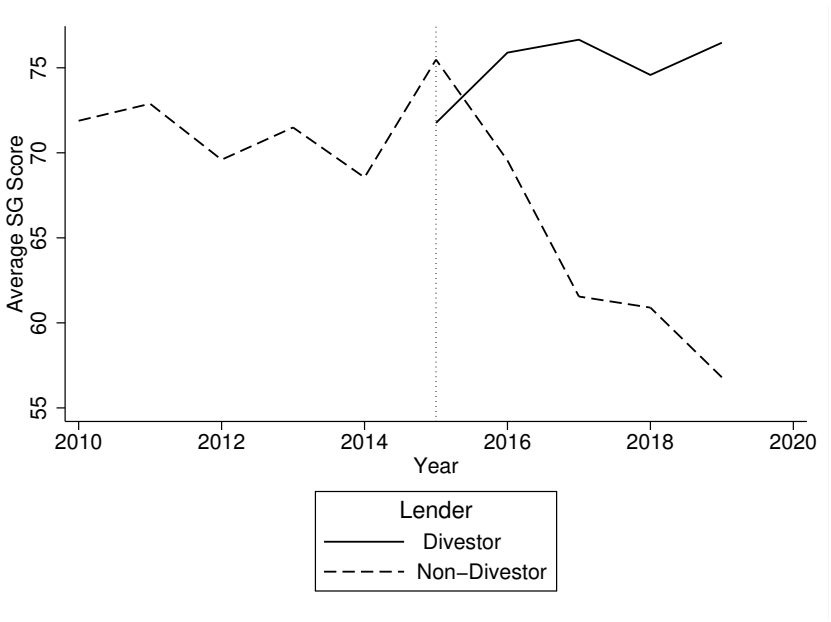


Figure 15: **SG Scores of Divestors compared to Non-Divestors**

This figure shows the average SG score per coal mining facility for divestors and non-divestors. Facilities are counted as divestor facilities if at least one lender with a previous coal divestment announcement is involved in the syndicated loan. The average SG score per coal mining facility is weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Only coal mining facilities are analysed. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

Table 8: **Effect of the Coal Divestment Movement on SG Scores**

This regression table shows the difference in the SG score between divestors and non-divestors for coal mining facilities. The endogenous variable SGScore measures the average SG score per facility, weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Divestor is a dummy variable that equals 1 if at least one lender with a previous coal divestment announcement is involved in the syndicated loan. The years 2015 to 2019 are analysed, as the first coal divestment announcements were made in 2015. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.4. All regressions include clustered Standard Errors for year and country of syndication. Regression (2) includes yearly fixed effects, regression (3) includes fixed effects for year and country of syndication. Only coal mining facilities are analysed.

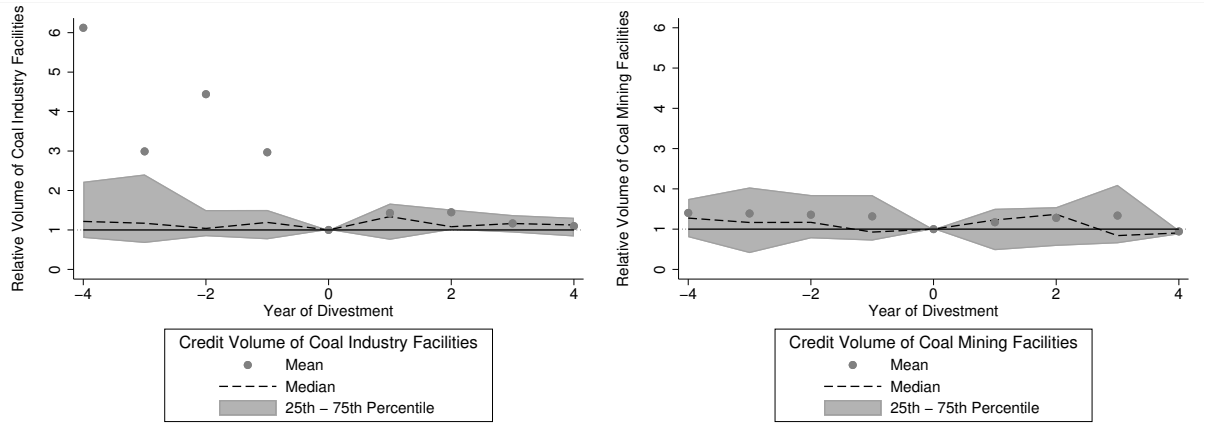
	(1) SGScore		(2) SGScore		(3) SGScore	
Divestor	5.911	(1.55)	3.994	(1.23)	-1.024	(-0.52)
Total Assets (mUSD)			-2.00e-08	(-1.81)	-3.30e-08	(-1.78)
Leverage (%)			0.230	(1.17)	-0.116	(-0.80)
Return on Equity (%)			-0.312	(-1.51)	-0.265	(-1.25)
Observations	232		232		232	
R^2	0.083		0.168		0.625	
Adjusted R^2	0.079		0.138		0.589	
Year FE	No		Yes		Yes	
Country FE	No		No		Yes	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

B.2 Credit Volume of Coal Facilities

I analyse the credit volume granted to the overall coal sector in figure 16 (a) and coal mining sector in figure 16 (b).



(a) Coal Industry Facilities

(b) Coal Mining Facilities

Figure 16: **Credit Volume of Coal Facilities Before and After the Divestment Announcement**

This figure shows the credit volume of coal facilities, calculated relatively for each lender, compared to the year of the divestment announcement. The results are calculated separately for coal industry facilities in figure (a) and coal mining facilities in figure (b). The analysis period ranges from 4 years before to 4 years after the divestment announcement. The year of the respective divestment announcement is set as year 0. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

B.3 Loan Spreads Before and After Divestment Announcements

Table 9: **Effect of Coal Companies and Coal Divestors on Loan Spreads**

This regression table shows the difference in the loan spread before and after coal divestment announcements. The endogenous variable AISD measures the loan spread per facility. CoalCompany is a dummy variable that equals 1 if the borrower is a coal company. Divestor is a dummy variable that equals 1 if at least one lender with a previous coal divestment announcement is involved in the syndicated loan. The regression includes fixed effects for year, country of syndication and loan type, as well as clustered Standard Errors for year, country of syndication and loan type. The years 2010 to 2019 are included.

	(1) AISD	
CoalCompany	-33.96***	(-4.99)
Divestor	-59.42***	(-6.52)
CoalComp * Divestor	10.94	(0.94)
Total Assets (mUSD)	-0.000000439***	(-9.52)
Leverage (%)	2.328***	(5.27)
Return on Equity (%)	-1.082*	(-2.38)
Credit Volume (mUSD)	-0.0216***	(-9.30)
Maturity (months)	0.485***	(4.62)
Number of Lenders	-3.676***	(-14.98)
Observations	63220	
R^2	0.339	
Adjusted R^2	0.337	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

B.4 Sustainability Scores on Facility Level

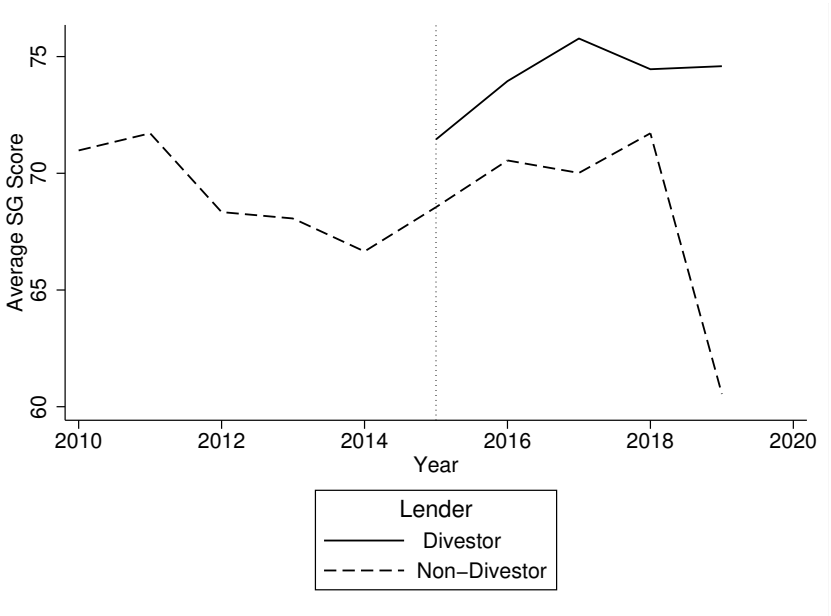


Figure 17: **SG Scores of Divestors compared to Non-Divestors**

This figure shows the average SG score per coal industry facility for divestors and non-divestors. Facilities are counted as divestor facilities if at least one lender with a previous coal divestment announcement is involved in the syndicated loan. The average SG score per coal industry facility is weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Only coal industry facilities are analysed. The years 2010 to 2019 are included. Coal divestment announcements are collected by the IEEFA (2020), see also section 3.1.

Table 10: **Effect of the Coal Divestment Movement on SG Scores**

This regression table shows the difference in the SG score between divestors and non-divestors for coal industry facilities. The endogenous variable SGScore measures the average SG score per facility, weighted relatively to the lender's share of contribution to the loan. See section 3.2.1 for more information. Divestor is a dummy variable that equals 1 if at least one lender with a previous coal divestment announcement is involved in the syndicated loan. The years 2015 to 2019 are analysed, as the first coal divestment announcements were made in 2015. More information on the empirical model and detailed explanations of the exogenous variables are provided in section 3.2.4. All regressions include clustered Standard Errors for year and country of syndication. Regression (2) includes yearly fixed effects, regression (3) includes fixed effects for year and country of syndication. The average SG score is 73.03. Only coal industry facilities are analysed. For 2019, non-divestor observations are excluded: As this group only includes 11 observations, the results might be inaccurate.

	(1)		(2)		(3)	
	SGScore		SGScore		SGScore	
Divestor	4.440**	(3.33)	1.500	(1.14)	0.0308	(0.03)
Total Assets (mUSD)			-1.52e-08*	(-2.53)	-1.29e-08*	(-2.26)
Leverage (%)			0.268*	(2.31)	0.0827	(0.83)
Return on Equity (%)			-0.465***	(-5.61)	-0.495***	(-4.46)
Observations	986		986		986	
R^2	0.079		0.213		0.406	
Adjusted R^2	0.078		0.207		0.379	
Year FE	No		Yes		Yes	
Country FE	No		No		Yes	

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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